[Riding to Market.]

IRISH SKETCHES.—No. III.

THE COUNTRY GIRL.

The sketch accompanying the present notice was taken from a very pretty country lass, seated, as she is represented, on her pony, between two panniers, or *kishes*, containing potatoes and a few eggs. The form of the baskets will be seen to differ altogether from the ordinary pannier: they are slung over a pad of twisted straw by ropes of the same material. The dress of the girl was the usual blue cloak, without either shoes or bonnet. She seemed a person of respectability, a little sun-burnt, and slightly freckled, with a mouth full of white teeth, and her laughing light-grey eye thickly fringed with long black eyelashes. She was what she looked to be, a small gardener's or cottager's daughter, carrying her little stock to Bantry, where there was a market. In making the sketch, it was not observed till long afterwards that the girl was sitting on the wrong side of the pony. When this was discovered, the sketch was put aside as the unlucky selection of an accidental rather than the ordinary mode of ladies' travelling; but on reading over Spenser, it was found that this very point had been a matter of grave remonstrance in the days of Elizabeth; and that the Irish ladies, with characteristic obstinacy, pleaded custom, the habits of their mothers and grandmothers, and refusing all advice, remained steadfast in their error. "Moreover, the manner of their women riding on the wrong side of the horse, I mean with their faces to the right side, as the Irish use, is (as they say) old Spanish, and some say African, for so amongst them the women, they say, used to ride."*

This sort of pannier is used all over the south and west of Ireland for the carriage of eggs, potatoes, turf, &c. When lifted out of its swing, it is set on its end by the hearth, and serves as a receptacle for the turf used for firing, and is called a turf-kish. A woman from Cork may be met with a basket of this kind swung across her back thirty miles from home, collecting eggs from the cottages, which she carries to Cork for sale, often knitting as she goes on her solitary pilgrimage.

Whatever may be the case as to the mode of riding, the cloak is not likely to go out of fashion; but in other parts of Irish female costume the cheapness of cotton prints has already effected some changes, and, it may be added, improvements, since greater cleanliness is promoted. The late Mr. Inglis, in his 'Journey throughout Ireland,' notices that for gowns Waterford stuff used to be the common material, and a gown made of this would last six or seven years; and during all that time, the pin that fastened it up behind was

* Spenser's 'View of the State of Ireland.

never taken out.' When at Thomastown, county Kilkenny, the same writer speaks of the fashions of a country parish. and bears testimony to the universality of the cloak. "Every woman," he says, "wears a cloak; and the hood of every cloak is thrown over the head, unless the cap underneath be an extremely smart one, in which case the hood is allowed to fall a little back; or if the cap be a non-such, it is altogether exposed. The habit of covering the head appears to be universal. If a girl is not possessed of a cloak, she will borrow the shelter of an apron, or even of a petticoat, like the women of La Mancha." Mr. Inglis saw also a resemblance to the Spanish costume in the dress of the men in this part of Ireland. The day was dry and mild, but almost every man wore a greatcoat.

The greatcoat, however, and the fashion of wearing it, are by no means modern innovations. John Derrick, in 'The Image of Ireland,' 1581, describes both the cloak and the coat as follows:—

"With jackets long and large,
Which shroud simplicity:
Though spiteful darts which they do bear
Import iniquity.
Their skirts be very strange,
Not reaching past the thigh;
With plaits on plaits they plaited are,
As thick as plaits may lie.
Whose sleeves hang trailing down
Almost unto the shoe;
And with a mantle commonly
The Irish *kerne* do go.
Now some amongst the rest
Do use another weed:
A coat, I mean, of strange device,
Which fancy first did breed.
His skirts be very short,
With plaits set thick about."

This is the same apparently as the "jacket" before mentioned. The trait of allowing the sleeves to hang down unoccupied is a curious custom to have endured so long.

USEFUL APPLICATIONS OF GEMS.

THE hard specimens of stone, which by the common consent of the majority of nations have always been deemed 'gems,' or 'precious stones,' are susceptible of several useful applications, irrespective of the decorative purpose to which they are generally applied. The qualities which give to gems a practical value in the arts and sciences are principally *hardness* and *high refractive power*; respecting both of which a few remarks may here be offered.

The hardness of gems, by contributing to indestructibility, gives to them a considerable portion of their value as a marketable commodity, and imparts to them, as materials for manufacture, an importance which counterbalances their excessive high price. The jewelling of watches may be taken as an illustration. This jewelling, as is well known, refers not to the external adornment of a watch, but to the employment of jewels for the bases of pivot-holes. Among the numerous wheels and pinions employed in a watch, some are rotatory to so vast an amount, that the ends of the pivots wear away any metallic substance in which the pivot works; even the hardest steel gives way to this uninterrupted friction. Hence, in the best watches, jewels, such as diamonds, rubies, sapphires, and chrysolites, are employed, as being harder than any metal with which we are acquainted, and therefore better prepared to resist the wear by friction.

Great difficulty is experienced in working these hard gems. To grind, polish, turn, drill, and set them into the frame-work of a watch, requires all the skill of the 'watch-jeweller.' The process requires the aid of a small lathe, small gravers, diamond-dust, small fragments of diamond called 'bort,' and turning-tools made by cementing small pieces of this 'bort' into a notch made in the end of short brass wires fixed to a handle. The phrase of "diamond cut diamond" is a significant one, for diamond forms the material of the cutting-tool as well (generally) as that of the article operated on. A little disk of copper has diamond fragments imbedded into its surface, and is made to revolve six or seven thousand times per minute; and the workman, holding the gem on the end of his finger, applies it to the copper disk, the diamond fragments of which wear down a flat surface on the gem. Then, reversing the position of the gem on the finger, another flat surface is similarly produced, parallel to the former. The gem is then cemented to a lathe, and is actually turned to the proper shape by the tools formed only of bits of wire having fragments of diamond at their extremity. Even yet is the diamond as a working tool not exhausted; for the hole in the gem, into which the pivot is to work, is drilled either with a steel drill moistened with diamond-powder and oil, or by a small fragment of diamond which itself acts as a drill. Nothing can better show the extreme hardness of the diamond than its employment throughout the production of jewel-holes. It will cut other stones, but is itself capable of being cut only by itself,—at least that appears to be the just inference from the proceedings of the jeweller.

Another very useful employment of the diamond is for cutting glass. Here we have an example of the fact that substances cut one another according to their relative degrees of hardness. Glass may by long usage be scratched by friction against metals, but in a general way it cannot be cut or divided by them. Yet glass, hard as it is, yields to the hardness of the diamond and some other gems, and is cut by them. Glass may be cut, or rather divided, by applying a heated wire at a particular part, by which the cohesion of the substance is lessened; but cutting by means of the diamond is the only effectual method employed. It is a curious consequence of the crystalline structure of the diamond, that it will cut only when drawn in one particular direction over the glass, that is, the line of the cut must bear a certain relation to a certain edge of the gem. With the glaziers' diamonds, which were used until the last few years, there was a difficulty in cutting the glass, owing to the uncertainty of placing it at once in the proper angle, so as to make it *cut* and not *scratch*. This led to the invention of the 'patent diamond,' in which the gem is so set that the user is guided in holding it in the right position by the handle into which it is fixed. The diamonds employed for this purpose are very small; but each one will cut many miles of glass before it exhibits any symptoms of being worn.

It may not perhaps be so generally known, but gems have been and are now employed for the nibs of pens. Pens made of gold, with small rubies at the nibs, have been known to be in constant use for many years, without exhibiting any symptoms of wear. These pens are said to write as fine as a crow-quill and as firm as a swan-quill, to possess considerable elasticity, and to produce a very uniform manuscript. Messrs. Hawkins and Mordan, twenty years ago, patented a contrivance for pens, in which the bulk of the pen was made of tortoiseshell or horn; the material was cut into nibs, and these being softened in boiling water, small fragments of diamond, ruby, or other precious stone, were imbedded into them by pressure. To give stability to the nibs, thin pieces of gold were affixed to the tortoiseshell or horn; and springs were occasionally attached, to adapt the pen to the hand of the user, according to the amount of pressure exerted on it in the act of writing. It has been often asserted, and is

perhaps true, that pens of this costly character, if prevented from collision with hard substances, and if washed occasionally with soap and water, become, from their long duration, really economical pens; but the original cost is so great as to have prevented them from coming into general use. It is for the preservation of these jewelled pens that Mr. Doughty some years ago contrived an inkstand lined with India-rubber, the soft texture of which prevents the nib of the pen from injury when dipped into the inkstand.

A peculiarly valuable application of gems is in the formation of lenses for microscopes, a mode of employment presenting many remarkable features. The property which renders gems available for this purpose is not their hardness, but their high refractive power. By this term is meant a power of bending the rays of light considerably out of the direction in which they fall on a transparent body. In the common lens of a telescope, a microscope, or a pair of spectacles, the refractive power of glass is made by imparting to the substance a curved surface, to bring all the rays of light to a focus or point, and in the two latter cases this may be done with convenience; but for microscopes of very high magnifying power, the refraction of glass is scarcely sufficient; the lenses are obliged to be used with inconveniently short foci and very deep curves.

Hence it has been thought that by using gems instead of glass, the high refractive power of the former would enable the maker to have lenses of less deep curvature, by which certain optical inconveniences would be avoided. Sir David Brewster was, we believe, the first to point out the advantages of this employment of gems. Having experienced the greatest difficulty in getting a small diamond cut into a particular form in London, he did not at first conceive it practicable to give to the gem the rigorously curved form requisite for a lens; and he for a time abandoned the project. Dr. Goring and Mr. Pritchard, who have devoted much time to the construction of microscopes, had their attention drawn to the subject by Brewster's remarks concerning diamond lenses; and they agreed to make the attempt of forming such a lens. Mr. Pritchard's detail of his proceedings so remarkably illustrates the difficulty of working even the smallest fragment of diamond, that it may be well to notice it here.

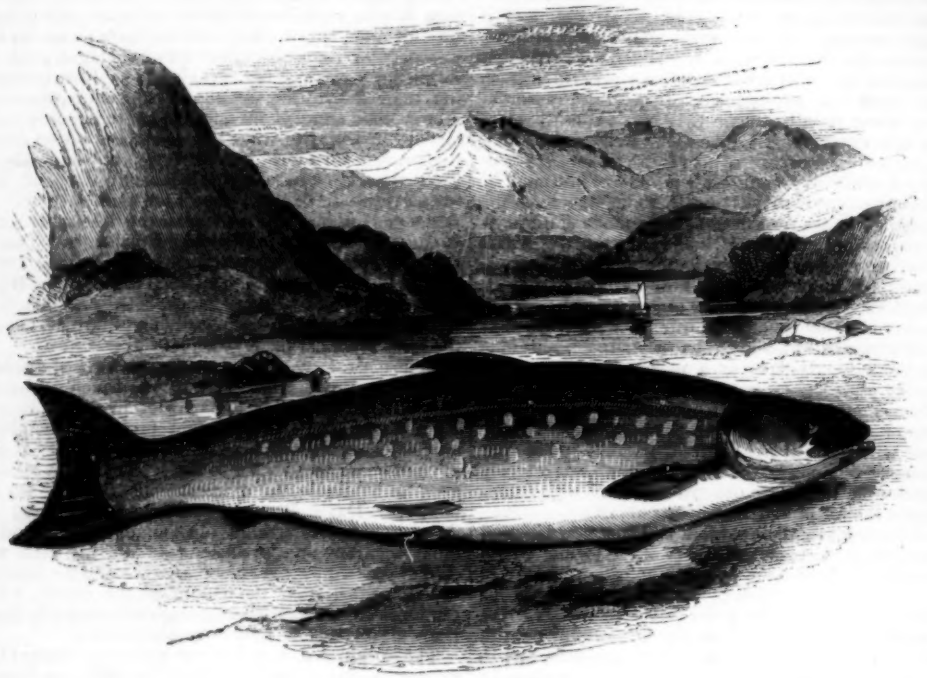
Mr. Pritchard was told by some diamond-cutters employed by a great London jeweller, that it was *impossible* to work a diamond into a spherical or lens form. He was thence driven to his own resources. He began upon a small diamond, to which it was proposed to give the curves which in glass would produce a lens of 1-20th of an inch focus, with a proportion of two to five in the radii of their surfaces. After great labour and difficulty he ground both surfaces to the proper curvature, and polished one of them, but unfortunately lost the diamond by some accident.

He then set about another, selecting a rose-cut diamond, which, to save labour, he proposed to form into a plano-convex instead of a double-convex lens, that is, to have one side flat instead of both sides curved. In the progress of working this stone, the heat generated by friction repeatedly melted the shell-lac cement by which the flat side was affixed to the tool or lathe; and after many trials, he found that when a little powdered pumice-stone was mixed with the shell-lac, the cement was better able to resist the fusing effect of the heat. He succeeded in working the gem to the required form, and using it as the lens of a microscope, "doubtless," as he observes, "the first time this precious gem had been employed in making manifest the hidden secrets of nature." On Mr. Pritchard showing a diamond lens thus made to the professed diamond-workers, they candidly owned that they were not acquainted with any means whereby such a figure could be given to the diamond. No less than fifty or sixty hours' labour is required to grind a tiny diamond into a double-convex form; and the minuteness of the whole affair may be judged from the following remark of Mr. Pritchard:—"Notwithstanding these difficulties, and the consequent expense and labour they entailed on me before sufficiently experienced in working upon this refractory material with certainty, I have now the satisfaction of being able, by inspection *à priori*, to decide whether a diamond is fit for a magnifier or not; and have now executed two plano-convex magnifiers of adamant, whose structure is quite perfect for microscopic purposes. One of these is about the *twentieth of an inch* focus, and is now in the possession of his Grace the Duke of Buckingham; the other, in my hands, is the *thirtieth* of an inch focus, and has consequently amplification enough for most practical purposes."

Before Mr. Pritchard began the working of diamond lenses, Sir David Brewster had succeeded in having lenses formed of ruby and garnet by an optician of Edinburgh; and at subsequent periods he employed garnet lenses made by several different artists. It may at once occur to a reader to ask, "How can a *coloured* gem be available for a microscope lens?" On this point Sir David Brewster remarks, after stating that the garnet lenses exhibit minute objects with admirable accuracy and precision:—"We can state with confidence that we have never experienced the slightest inconvenience from the colour of the garnet, which diminishes with its thickness, and consequently disappears almost wholly in very minute lenses."

The sapphire is, in refractive power and many other properties, nearly allied to the ruby, differing from it chiefly in colour; and Mr. Pritchard has formed many lenses of sapphire, which, though inferior to those of diamond, are said to be vastly superior to any made of glass for microscopic purposes. The relative powers of the three substances, diamond, sapphire, and glass, as microscopic lenses, may perhaps be conveniently shown in this way: that if the curvature, or the focal distance of a glass lens, be reckoned as 3, then the curvature or focal distance of a sapphire lens having the same magnifying power will be 5, and of the diamond lens 8; the gem lenses being thinner, and having their focal points farther off, than the glass lens. One useful effect of the longer focal distance in a gem lens to produce the same power is this, that in small lenses of glass the thickness of the glass is such that there is no room between its anterior surface and the object for the admission of instruments for dissection, and not even for the thinnest plate of glass; so that it is impossible to use glass lenses of small foci in viewing objects placed in glass sliders.

It may not be amiss to mention that the high refractive power of gems, particularly the diamond, by which they are fitted for microscopic application, is in itself one of the chief sources of their brilliancy and beauty, for which they are sought after with such avidity as personal ornaments. The mode in which light, falling on a transparent substance, is partly reflected from the surface and partly transmitted through the body, depends greatly on the refractive power, the reflected light being proportionally more brilliant as the refractive power becomes higher. When a gem is worn as an ornament, we do not see *through* it, for it is generally backed by some opaque substance: we become cognisant of its beauty by the light reflected *from* it; and this light is more abundant from a piece of diamond than from a piece of glass of the same size and shape. If we were to hold a diamond between a strong light and the eye, it would appear less luminous than a piece of glass, and we should by no means perceive that beauty which the gem presents by reflected light.



[The Char—Salmo alpinus.]

THE CHAR.

THE habits of the salmon genus are more diversified than those of many other fish, and hence they have naturally attracted greater observation; but notwithstanding this, the number of those who are able to distinguish the different species and varieties is small. Even in the same water there may be found singular varieties of the same species, originally occasioned, as Sir Humphry Davy suggests in his 'Salmonia,' by food, peculiarities of water, &c.; the qualities which these produce being, as he observes, "transmitted to the offspring, and produce varieties which retain their characters as long as they are exposed to the same circumstances, and only slowly lose them." He adds, "Plenty of good food gives a silvery colour and round form to fish, and the offspring retain these characters. Feeding on shell-fish thickens the stomach, and in many generations, probably, the gillarro-trout becomes so distinct a variety as to render it doubtful if it be not a distinct species." Again, salmon at different ages undergoes changes which render the identification of the species one of considerable difficulty. In No. 334 we have stated the difficulties which attend this task. The char is the least common of the salmon genus. When Walton published his 'Angler,' he stated his belief that it was only found in Lake Windermere; but it is now known to be more widely distributed. Other English lakes besides Windermere contain char; and it is found in the lakes in Wales, in the Scotch lochs, and in Lough Esk in Ireland. The lakes of the Tyrol are famous for char. Speaking of the char, Sir H. Davy says,—"They generally haunt deep cool lakes, and are seldom found at the surface till late in the autumn." At this period they will take either fly or minnow, and he mentions as something remarkable having caught a char in summer in one of the beautiful, small, deep lakes of the Upper Tyrol, "but it was where a small cool stream entered from the mountain; and the fish did not rise, but swallowed the artificial fly under water."

The char is a very beautiful fish as well as excellent for the table, combining the flavour of the trout with that of the mullet. It is a great delicacy when potted. In No. 517 there will be found a very ample account of the char and char-fishing, by a Westmoreland correspondent well qualified to write on the subject, and we cannot do better than refer the reader to his account.

As it may be some time before we again notice any of our British Fishes, we take the opportunity of giving Sir Humphry Davy's summary of the various attractions of angling, and the reasons why it has not unfrequently been pursued with ardour by poets and philosophers:—"The search after food is an instinct belonging to our nature; and from the savage in his rudest and most primitive state, who destroys a piece of game, or a fish, with a club or spear, to man in the most cultivated state of society, who employs artifice, machinery, and the resources of various other animals, to secure his object, the origin of the pleasure is similar, and its object the same: but that kind of it requiring most art may be said to characterize man in his highest or intellectual state; and the fisher for salmon and trout with the fly employs not only machinery to assist his physical powers, but applies sagacity to conquer difficulties; and the pleasure derived from ingenious resources and devices, as well as from active pursuit, belongs to this amusement. Then as to its philosophical tendency, it is a pursuit of moral discipline, requiring patience, forbearance, and command of temper. As connected with natural science, it may be vaunted as demanding a knowledge of the habits of a considerable tribe of created beings—fishes, and the animals that they prey upon, and an acquaintance with the signs and tokens of the weather and its changes, the nature of waters, and of the atmosphere. As to its poetical relations, it carries us

into the most wild and beautiful scenery of nature; amongst the mountain lakes, and the clear and lovely streams that gush from the higher ranges of elevated hills, or that make their way through the cavities of calcareous strata. How delightful in the early spring, after the dull and tedious time of winter, when the frosts disappear and the sunshine warms the earth and waters, to wander forth by some clear stream, to see the leaf bursting from the purple bud, to scent the odours of the bank perfumed by the violet, and enamelled, as it were, with the primrose and the daisy; to wander upon the fresh turf below the shade of trees, whose bright blossoms are filled with the music of the bee; and on the surface of the waters to view the gaudy flies sparkling like animated gems in the sunbeams, whilst the bright and beautiful trout is watching them from below; to hear the twittering of the water-birds, who, alarmed at your approach, rapidly hide themselves beneath the flowers and leaves of the water-lily; and as the season advances, to find all these objects changed for others of the same kind, but better and brighter, till the swallow and the trout contend as it were for the gaudy May-fly, and till, in pursuing your amusement in the calm and balmy evening, you are serenaded by the songs of the cheerful thrush and melodious nightingale, performing the offices of paternal love, in thickets ornamented with the rose and woodbine!"

PLANTS USED IN DYEING YELLOW.

In glancing at some of the more important plants used to produce a yellow dye, it will be sufficient to confine our attention principally to *weld*, *fustic*, *quercitron-bark*, *turmeric*, and *annotto*, the remaining kinds being of more limited application.

Weld is a plant of which the leaf and stem yield the colouring-matter employed by the dyer, the stem rising from one to three feet in height. It is a native of Britain; it flowers in June and July, and ripens its seeds in August and September. It is cultivated in a few places in England, especially Essex, and is said to have this advantage to the farmer over all other colouring plants, that it only requires to be taken up and dried, when it is fit for the dyer. Mr. Loudon states that weld will grow on any soil, but that fertile loams produce the best crops. When the soil is prepared, the seed is sown in April or the beginning of May, generally broad-cast, the quantity being from two quarts to a gallon per acre. Being a biennial, and no advantage being obtained from it the first year, it is sometimes sown with corn crops in the manner of clover; but the best crops are obtained by cultivating the weld alone. It is usual to thin the plants to six or eight inches mutual distance. The crop is taken by pulling up the entire plant; and the proper period is when the bloom has been produced the whole length of the stem, and the plants are just beginning to turn of a light or yellowish colour. Some cultivators pull it rather early, without waiting for the ripening of the seeds; because the quantity of dye yielded is thought to be larger, and the land is then sooner ready for other purposes. The plants are drawn up by the roots in small handfuls; and after each handful has been tied up with one of the stalks, they are set up in groups of four in an erect position, and left to dry. Sometimes, however, they become sufficiently dry by turning without being set up. After they have remained till fully dry, which is mostly effected in a week or two, they are bound up into large bundles, each containing sixty handfuls, and weighing fifty-six pounds. Sixty of these bundles make a load. In this state it is sold to the dyers, who make a decoction from the dried plants.

A decoction of weld, if strong, has a brownish-yellow colour, and when diluted with water it acquires a shade of green. The addition of certain alkalies, acids, and salts gives to this decoction almost every shade of yellow; and a yellow precipitate is obtained under some circumstances. Weld is preferred to all other substances in giving a lively green lemon-yellow, and is used also in dyeing silk of a golden yellow colour. Blue cloths are dipped in the decoction to produce green. It was formerly much used in calico-printing, but has been gradually nearly displaced in this department by quercitron-bark.

Fustic is a wood whose colour has given it a name in many different countries; such as the German, *gelbholz;* the Dutch, *geelhout;* the French, *bois jaune;* and the Italian, *legno giallo;* all implying 'yellow wood.' The fustic-tree, sometimes called the 'dyers' mulberry-tree,' is a native of Jamaica and other West India islands. It grows most abundantly about Campeachy, whence the wood is imported in great quantity as a dye ingredient. Sloane describes the tree as having a large and straight trunk, sixty feet or more in height, with long and large roots; the bark of the trunk is light brown, with yellow clefts; and the wood is very firm and solid, and of a fine yellow colour. In an 'Essay on the Slave Trade' written by Mr. Clarkson nearly sixty years ago, a tree is described which may possibly be a species of the one here mentioned, though we are not aware that it has ever been determined. He says,—"A gentleman, resident upon the coast of Africa, ordered some wood to be cut down to erect a hut. Whilst the people were felling it he was standing by, and during the operation some juice flew from the bark of it, and stained one of the ruffles of his shirt. He thought that the stain would have washed out; but on wearing it again he found that the yellow spot was much more bright and beautiful than before, and that it gained a lustre every subsequent time of washing. Pleased with the discovery, he sent home a small sample of the bark, which produced a valuable yellow dye."

Ever since the discovery of America, fustic-wood has been used in dyeing, as appears by a paper written by Sir William Petty in the 'Philosophical Transactions.' Its price is moderate, the colour it imparts is permanent, and it readily combines with indigo, which renders it a valuable substance for green dyes. Before it can be employed as a dye-stuff, it is cut into chips and put into a bag, that it may not tear the woven fabric to which it is to impart colour. When a strong decoction of the wood is prepared, the colour is of a reddish yellow; and when diluted it is of an orange yellow. The colouring-matter is very easily yielded to water. The addition of acids turns it to a paler yellow, and various metallic salts throw down a precipitate of a yellow or greenish yellow tint. The consumption of this wood in England is about six thousand tons a year, the price varying from about eight to twelve pounds per ton.

Some confusion has arisen in the name fustic, from there being two kinds, called 'old' and 'young fustic; the former of which is the fustic-tree just spoken of; while the latter is the Venice sumach, a shrub of a totally different kind. The cause of misnomer is supposed by Dr. Bancroft to have been this:—Venice sumach, called in France *fustet*, was known and employed as a yellow dye long before the American tree was known in Europe, and was introduced among the English dyers by the name of *fustic*. Then, when at a later period they became acquainted with an American tree yielding a yellow dye, they appear to have given the same name to it, and to have made a distinction by calling the shrub 'young fustic,' and the plant 'old fustic.' Botanically there is no ground for this nomenclature.

Quercitron-bark was first introduced as a yellow-dye ingredient by Dr. Bancroft about seventy years ago. He obtained a patent for the discovery in 1775; but the American war breaking out soon afterwards, he was deprived of its advantages. In consideration of this circumstance, parliament passed an Act in 1785, securing to him the privileges conveyed by his patent for fourteen years. At the expiration of the latter period the House of Commons agreed to extend the privilege for an additional period of seven years; but the House of Lords rejected the bill. The result was that Dr. Bancroft reaped but little benefit from a discovery which has been largely beneficial to our manufacturers.

This material is the bark of the *Quercus nigra*, or *Quercus tinctoria*. The bark consists of three coats: a black exterior, which Bancroft supposes to have concealed from Linnæus the yellow colouring-matter; secondly, a middle or cellular coat, in which the colouring-matter principally resides; and thirdly, an interior or cortical part, containing a smaller portion of yellow substance. The exterior blackish coat affords a little of the yellow; but as this is impure and of a more dull colour, the black coating is shaved or scraped from the remainder. When this is done, and the remaining cellular and cortical parts are ground by millstones, they will separate partly into a light fine powder, and partly into stringy filaments or fibres, which last yield but about half as much colour as the powder. The two component parts, namely, the fibre and the powder, are recommended to be used in the same proportions in which they occur in the tree, as affording the means of obtaining the greatest quantity of the colouring substance. Bancroft states that the quercitron-bark will yield, weight for weight, eight times as much colouring-substance as weld, and four times as much as fustic. This colouring-matter is readily extracted by hot water, and is said to weigh about one-twelfth part of the bark from which it has been obtained.

Annotto or *Anatto* is a yellow colouring-substance which has gained notoriety rather for its property of dyeing or tinting cheese and butter, than for dyeing cloth; but it has been long used for the latter purpose likewise. It is a kind of red paste obtained from the berries of the bixa orellana, a South American plant. This plant produces oblong hairy pods, somewhat resembling those of the chestnut, and within each of these are thirty or forty irregularly-figured seeds, enveloped in a pulp of a bright red colour and unpleasant smell. This pulp was formerly used as paint by some of the Indians; but it is now made commercially valuable. The seeds, together with the red tough matter that surrounds them, are softened with water in a wooden trough, until the kernels are separated from the pulp by a kind of fermentation, which is accompanied by a very nauseous smell. The mass is then strained through a sieve, and boiled: upon which a thick reddish scum separates, and it is this which forms the colouring-substance. After being skimmed and cooled, it is moulded into roundish lumps, wrapped round with leaves of trees, and packed for sale. Another mode of procuring the colouring-matter is by steeping the pods in boiling water, extracting the seeds, and leaving the pulp to subside; the fluid being subsequently drawn off, the residuum, with which oil is sometimes mixed up, is placed in shallow vessels and gradually dried in the shade.

The annotto of commerce is of two kinds, viz. *flag* or *cake*, and *roll* annotto. The first is the most important, and is furnished almost wholly by Cayenne; it comes to us principally by way of the United States, in square cakes weighing two or three pounds each, and wrapped in banana-leaves. When well made it is of a bright yellow colour, soft to the touch, and of a good consistence. It is used by the dyers for imparting a deep orange tint to silk and cotton; and we might thus have included it among the red dyes, but it has been ranked by Dr. Thomson among the yellow series. In fact it has been found by Chevreul that annotto contains two different colouring-matters, the one yellow and the other red. The yellow colouring-matter is soluble in water and alcohol, and slightly in ether. The red colouring-matter is scarcely soluble in water, but it dissolves in alcohol and ether, communicating to these liquids an orange-red colour. The dye which annotto gives to silk and cotton is said to be rich and brilliant, but not permanent.

It is the flag or cake annotto which is used by the dyer. The *roll* annotto, brought principally from Brazil in small rolls not exceeding two or three ounces in weight, is hard, dry, compact, brownish on the outside, and of a beautiful red within. Of the roll annotto Mr. M'Culloch states, "it is the best of all ingredients for the colouring of cheese and butter, and is now extensively used for that purpose in all the British and in some of the continental dairies. In Gloucestershire it is the practice to allow an ounce of annotto to a hundredweight of cheese; in Cheshire eight pennyweights are reckoned sufficient for a cheese of sixty pounds. When genuine, it neither affects the taste nor the smell of cheese or butter The Spanish Americans mix annotto with their chocolate, to which it imparts a beautiful tint."

Turmeric is the root of a tree called the *curcuma longa*, growing principally in Bengal, Java, and China. It is externally greyish, and internally of a deep lively yellow or saffron colour, very hard, and not much unlike ginger in size and shape. It has a slightly aromatic and not very agreeable smell; and a bitterish, slightly acrid, and somewhat warm taste. It readily gives out its colouring ingredient both to water and to spirit, communicating to the former a deep yellow, and to the latter a fine yellowish red tint. Turmeric was formerly in considerable estimation as a medicine; but in Europe it is now employed almost solely as a dye. It yields a beautiful bright yellow colour, which, however, is extremely fugitive, and no means have been hitherto discovered of fixing it. It is sometimes employed to heighten the yellows made with weld, and to give an orange tint to scarlet.

There are numerous plants employed in a limited degree to impart a yellow dye, or to assist other ingredients in effecting it. One of these is saw-wort (*serratula tinctoria*), which affords a good substitute for weld in some departments of dyeing, in which it communicates a bright lemon colour of considerable durability. The unripe berries of the rhamnus infectorius, called 'French berries,' are sometimes employed for imparting a lively yellow; but it is so fugitive, that the use of this substance is but little extended. A plant called 'dyers' broom' is occasionally employed in dyeing stuffs of the coarser kinds. So also are the bark of the American hickory, the leaves of the sweet-willow the seeds of the purple trefoil, saffron, chamomile, sumach, the three-leaved hellebore, and other plants. But all these are of such partial application that they need not be dwelt on. Weld, fustic, and quercitron are the three principal plants yielding a yellow dye. The mineral yellows, of which chromate of lead is very valuable to the calico-printer, we do not propose to notice here.

TITLES OF HONOUR.

TITLES of Honour are words or phrases which certain persons are entitled to claim as their right, in consequence of certain dignities being inherent in them. They vary in a manner corresponding to the variety of

the dignities, or, in other words, with the rank of the possessor. Thus Emperor, King, Czar, Prince, are titles of honour, and the possessors of the high dignities represented by these words are, by the common consent of the civilized world, entitled to be so denominated, and to be addressed by such terms as Your Majesty and Your Royal Highness. These are the terms used in England, and the phrases in use in other countries of Europe do not much differ from them. In fact one European nation seems to have borrowed from another, or all to have taken their titles of honour for this exalted rank from a common original; so that little of the peculiar genius of the European nations can be traced in the terms by which they show their respect for the persons of highest dignity. But it is different when we come to compare them with the Oriental nations. In those seats of antient civilization the most extravagant terms of compliment are in use, and a little sovereign of a wandering tribe rejoices in titles of honour, numerous and inflated in the highest degree. In the series of Roman emperors, the word Cæsar, originally the name of a family, became a title of honour; Augustus was another; and Pater Patriæ a third.

The five orders of nobility in England are distinguished by the titles of honour, Duke, Marquis, Earl, Viscount, and Baron: and the persons in whom the dignity of the peerage inheres are entitled to be designated by these words; and if in any legal proceedings they should be otherwise designated, there would be a misnomer by which the proceedings would be vitiated, just as when a private person is wrongly described in an indictment; that is, the law or the custom of the realm guarantees to them the possession of these terms of honour, as it does of the dignities to which they correspond. They are also entitled to be addressed by such phrases as My Lord, My Lord Marquis, My Lord Duke; and they have usually prefixed to their titles, properly so called, certain phrases, as High and Mighty Prince, Most Noble, Right Honourable, varying with the kind and degree of the dignity possessed by them. The other members of the families of peers have also their titles of honour. Thus the lady of a peer has rank and titles corresponding with those of the husband. All the sons and daughters of peers are Honourable, but the daughters of earls and peers of a higher dignity are entitled to the distinction of being called Lady, and the younger sons of dukes and marquises are by custom addressed as My Lord.

The orders of nobility in other European countries differ little from our own. They have their Dukes, Marquises, Counts, Viscounts, and Barons. We cannot enter into the nice distinctions in the dignities of foreign nations, or in the titles of honour which correspond to them.

Another dignity which brings with it the right to a title of honour is that of knighthood. This dignity is of very antient origin, and, in the form in which we now see it, may be traced far into the depths of the middle ages, if it be not, as some suppose, a continuation of the Equites of Rome. Persons on whom this honour is conferred take rank above the gentlemen and esquires, and are entitled to the prefix Sir to their former name and surname. Their wives also are entitled to prefix the word Dame, and to be addressed by the compellation Your Ladyship or My Lady. The Knights of particular Orders, as of the Garter, the Thistle, St. Patrick, the Bath, are a kind of select number of the body of the knighthood, and the name of the Order to which they belong is ordinarily used by and of them, and thus becomes of the nature of a title of honour. The Bannerets of former ages were a class of knights superior to the ordinary knight-bachelor, forming in fact an Order intermediate between the knight, in its ordinary sense, and the baron. The Baronet, which is quite a new dignity, not having been known before the reign of James I., has, besides its name, which is placed after the name and surname of the person spoken of, the privilege of prefixing Sir; and their wives are entitled to the prefix of Dame, and to be addressed as My Lady and Your Ladyship.

Besides these, there are the ecclesiastical dignities of Bishop and Archbishop, which bring with them the right to certain titles of honour besides the phrases by which the dignity itself is designated. And custom seems to have sanctioned the claim of the persons who possess inferior dignities in the church to certain honourable titles or compellations, and it is usual to bestow on all persons who are admitted into the clerical order the title of Reverend.

There are also academical distinctions which are of the nature of titles of honour, although they are not usually considered to fall under the denomination. Municipal offices have also titles accompanying them; and in the law there are very eminent offices the names of which become titles of honour to the possessors of them, and which bring with them the right to certain terms of distinction.

All titles of honour appear to have been originally names of office. The earl in England had in former ages substantial duties to perform in his county, as the sheriff (the Vice-Comes or Vice-Earl) has now; but the name has remained now that the peculiar duties are gone, and so it is with respect to other dignities. The emperor or king, the highest dignity known in Europe, still performs the duties which originally belonged to the office, or at least the most important of them, as well as enjoys the rank, dignity, and honours; and on the Continent there are dukes and earls who have still an important political character.

Some of these dignities and the titles correspondent to them are hereditary. So were the eminent offices which they designate in the remote ages, when there were duties to be performed. Hence hereditary titles.

The distinction which the possession of titles of honour gives in society has always made them objects of ambition; and it may be questioned whether, as far as there has been any feeling in operation besides that of a sense of duty, the great exertions which are made in the service of the country are not stimulated less by the expectation of pecuniary reward, than by the hope of receiving one of these titles of honour which shall descend to a man's posterity. They cost nothing; and hence it is that titles of honour have been called "the cheap defence of nations."

Whoever wishes to study this subject in all its details will do well to resort to two great works: one, the late 'Reports of the Lords' Committees on the dignity of the Peerage;' the other, the large treatise on 'Titles of Honour,' by the learned Selden. The latter was first printed in 4to., 1614; again, with large additions, folio, 1631.

Artificial Lakes in Ceylon.—The Candelay Lake is situate within thirty miles of Trincomalee, in an extensive and broad valley, around which the ground gradually ascends towards the distant hills that envelop it. In the centre of the valley, a long causeway, principally made of masses of rock, has been constructed to retain the waters that from every side pour into the space enclosed within the circumjacent hills and the artificial dam thus formed. During the rainy season, when the lake attains its greatest elevation, the area of ground over which the inundation extends may be computed at fifteen square miles. This work of art, and others of nearly equally gigantic proportions in the island, sufficiently indicate that at some remote period Ceylon was a densely-populated country, and under a government sufficiently enlightened to appreciate, and firm to enforce

the execution of an undertaking which, to men ignorant of mechanical powers, must have been an Herculean operation; for, such is the capricious nature of the mountain-streams in this tropical island, where heavy rain frequently falls without intermission for many successive days, that no common barrier would suffice to resist the great and sudden pressure that must be sustained on such occasions. Aware of this peculiarity in the character of their rivers, the Cingalese built the retaining-wall that supports the waters of the lake of Candelay with such solidity and massiveness as to defy the utmost fury of the mountain-torrents. Nearly the whole of its extent is formed with vast hewn masses of rock, to move which by sheer physical force must have required the united labour of thousands. In more favoured lands, the object to be gained would by no means compensate for the toil and time requisite for the damming of a valley by a causeway two miles in extent; but in Ceylon, Nature, although bountiful in all other respects, is alternately lavish and chary of the element whereon the labours of agriculture mainly depend. In the eastern provinces, incessant rains are succeeded by long-continued droughts, during which the fiery rays of the sun suck up the innumerable rills that in the wet season spread over the face of the country. The largest rivers in this part of the island then subside into petty rivulets; and there being no natural lakes or large sheets of water, the necessity of supplying the want of these by the labours of art becomes apparent. Hence the Cingalese have, from the earliest periods, been attentive to the formation of artificial reservoirs, wherever they could be advantageously constructed; and the lakes of Candelay, Minere, Bawaly, and many others of less note, attest the energy and perseverance of the ancient islanders in such constructions.—*De Butt's Rambles in Ceylon.*

A London Fire.—Of all the rallying words whereby multitudes are gathered together, and their energies impelled forcibly to one point, that of 'Fire!' is, perhaps, the most startling and the most irresistible. It levels all distinctions; it sets at nought sleep, and meals, and occupations, and amusements; it turns night into day, and Sunday into a 'working-day;' it gives double strength to those who are blessed with any energy, and paralyses those who have none; it brings into prominent notice, and converts into objects of sympathy, those who were before little thought of, or who were perhaps despised; it gives to the dwellers in a whole huge neighbourhood the unity of one family. There are probably but few inhabitants of London who have not, at some time or other, witnessed a 'fire,' or experienced the awful emotions attendant on it. The wild cry which breaks the stillness of sleep, and arouses young and old in the dead of the night, is perhaps as terrible as the scene which the eye is afterwards called upon to witness; the uncertainty as to the locality of the catastrophe, and the probable suffering of those who are near and dear to us, gives to the first waking moment an undefined, but intense terror. When we gain the spot, perhaps only a few houses removed from us, we may see the glimmerings of light in an upper window, and perhaps a poor startled inmate entreating for succour. A crowd gradually collects, night-patroles or policemen assume the guidance below, and everybody calls out to everybody else to go somewhere or do something for the release of the sufferers. In a short time we hear an engine dashing through the neighbouring streets: perhaps it is a 'half-pint' parish engine, eagerly urged on as a means of gaining the proffered reward for first arrival; but more probably it is one of the Fire Brigade engines. The turncock is aroused, the hose of the engine applied to the plug, and men and boys (of whom there are always plenty at a fire) are hired at sixpence an hour to work the engine. Then does the bold fireman force an entry into the hapless house, and combat his fiery foe at close quarters—a notable improvement, by the bye, introduced by Mr. Braidwood; more hazardous, but more effectual than the old method of pouring a stream from without through a window to fall whither it may. Then may we mark how the firemen, neglecting the mere furniture of the house, look first to the safety of the inmates, and then to the extinguishment of the fire itself; and we may contrast with this the senseless terror which prompts the indwellers, before the arrival of the firemen, to turn everything literally 'out of window;' to hurl looking-glasses, tables, chairs, to the ground, where they are of course dashed to pieces, without service being rendered to any one—unless, indeed, it may be of that kind which is called 'spiting an enemy,' the fire being considered as such. The fire increases in intensity; the roused inmates find an asylum in the house of a neighbour; and a flood of water is poured on the burning materials. At one moment, when a portion falls in, the glare is deadened; at the next, the flame bursts forth with redoubled energy. More and more engines tear along to the lurid spot; more and more spectators assemble; every one asks, and no one can answer, how the fire arose? Are they all saved? Are they insured? As time progresses, so do the terrible apprehensions of the neighbours, each adjoining house becoming in turn the object of solicitude. As the bulk of ignited material increases, so does the distance at which the conflagration is visible, and so also the field of terror and solicitude. There is a singular difference in the manner in which fires are regarded by the populace in different countries. Without alluding to the fatalism of the Turks, which lamentably damps their energies at such a time, we may notice a difference in this matter between the Londoners and the Parisians. Some few years ago the London correspondent of the French newspaper 'Le Temps' gave the following paragraph:—"There is something imposing in the spectacle of a fire in this metropolis. The English people, commonly so phlegmatic, so slow, so morbid, seem, in the twinkling of an eye, wholly to change character. What self-possession, what order, under circumstances so painful and difficult! Accustomed as I have been to similar scenes in Paris, I could previously form no idea of the astonishing promptitude with which assistance the most efficacious was at once organized. I compared our wretched little engines, dragged with difficulty over the pavement of Paris by our brave *pompiers*, already half dead with that fatigue before the real occasion for their exertion begins—I compared those with the powerful pump-engines brought to the spot by four powerful horses at full gallop, and the firemen sitting at their ease on the engines. I thought of the wild confusion of our chains—of the cries of all the workmen—of our leathern buckets brought empty to the engine,—while I saw before me the water pouring, the streets inundated, and the pipes, like brilliant *jets d'eau*, lit up by countless torches, and rising above the crowd as a symbol of safety to a man in the midst of dangers from fire. With us every passer-by is stopped to work the engine; here, the difficulty is to prevent the people from so doing." Improvements have been made in the fire establishment at Paris since the above remarks were written.—*London.*

Advantages of an Improved Population.—In the Sanitary Report Mr. Chadwick establishes the very important fact that pecuniary interest even is connected with the highest physical and moral improvement of the lowest of the labouring classes. Mr. Smith, of Deanston, having effected some important improvements in the economy of his factory, found the advantage of such arrangements. "The improved health of the workpeople was attended by more energy and better labour; by less of lassitude and waste from relaxed attention; by fewer interruptions from sickness, and fewer spare hands to ensure the completion of work." Mr. Chadwick adduces another gratifying instance of the same kind, where improved tenements had been erected and superior provisions made for education; and the proprietor acknowledged that, "although he made the improvements from motives of a desire to improve the condition of his workpeople, or what might be termed the satisfaction derived from the improvements as a 'hobby,' he was surprised by a pecuniary gain found in the superior order and efficiency of his establishment, in the regularity and trustworthiness of his workpeople, which gave even pecuniary compensation for the outlay of capital and labour bestowed upon them. He stated that he would not for 7000*l.* change the entire set of workpeople on whom care had been bestowed, for the promiscuous assemblage of workpeople engaged in the same description of manufactures."

Effects of Culture.—The almond, with its tough coriaceous husk, has been changed by long culture into the peach, with its beautiful, soft, and delicious pulp; the acrid aloe into the luscious plum; and the harsh, bitter crab, into the golden pippin. Attention to nutrition has produced quite as marked changes in the pear, cherry, and other fruit-trees; many of which have not only been altered in their qualities and appearance, but even in their habits. Celery, so agreeable to most palates, is a modification of the apium graveolens, the taste of which is so acrid and bitter that it cannot be eaten. Our cauliflowers and cabbages, which weigh many pounds, are largely-developed coleworts, that grow wild on the sea-shore, and do not weigh more than half an ounce each. The rose has been produced by cultivation from the common wild-briar. Many plants may be modified with advantage, by suppressing the growth of one part, which causes increased development of other parts.—*Dr. Truman on Food.*